

What is Claimed:

1. A stimulation lead to lie along and stimulate tissue comprising:
a sheath to be placed in the intrathecal space having a distal and proximal end;
at least one electrode along the exterior of the distal end of the sheath to lie
along tissue;
a fixing element on the sheath configured to fix the electrodes in place along
the tissue; and
a passage extending from an inlet at the proximal end of the sheath to one or
more outlets at the distal end of the sheath.
2. A lead according to Claim 1, wherein the fixing element includes at
least one of inflatable balloon, nitinol, tines, and sheath shape.
3. A lead according to Claim 1, wherein the outlets are at one or more of
the tip of the distal end, the adjacent to the tip of the distal end and on the electrode.
4. A lead according to Claim 1, including an optical fiber in the passage.
5. A lead according to Claim 1, including one or more optical channels
extending from a port on the proximal end of the sheath to a port at the distal end of
the sheath.
6. A lead according to Claim 5, wherein the port at the distal end is at one
or more of the tip of the distal end, adjacent to the tip of the distal end and on one or
more of the electrode contacts.
7. A lead according to Claim 1, including an additional electrode spaced
from the at least three electrodes spaced along the exterior of the sheath; and the
additional electrode having a surface area length on the sheath greater than the surface
area of each of the at least three electrodes.
8. A lead according to Claim 7, wherein the additional electrode is at
least twice the surface area of the at least three electrodes.
9. A lead according to Claim 7, wherein the additional electrode is spaced
from the at least three electrodes by at least ten millimeters.
10. A lead according to Claim 7, wherein the sheath includes a wire
extension extending from its distal end to its proximal end and the additional
electrode is on the wire extension.

11. A lead according to Claim 1, including at least three electrodes spaced along the exterior of the sheath, and the electrodes each extend no greater than 270 degrees about the exterior of the sheath.

12. A lead according to Claim 1, including at least three electrodes spaced along the exterior of the sheath, and the electrodes each extend no greater than 90 degrees about the exterior of the sheath.

13. A lead according to Claim 1, including at least three electrodes spaced along the exterior of the sheath, and the electrodes each extend no greater than 60 degrees about the exterior of the sheath.

14. A method of neurostimulation using a catheter electrode assembly including a sheath having a distal and proximal end, at least three in-line electrodes spaced along the exterior of the distal end of the sheath to lie in-line along the spinal cord, and a fixing element configured to fix the electrodes in place along the spinal cord; the method comprising:

inserting a catheter electrode assembly into the intrathecal space and positioning adjacent a spinal cord;

fixing the electrodes at a desired location along the spinal cord using the fixing element; and

providing stimulation pulses to a selected pair of electrodes.

15. The method according to Claim 14, wherein the catheter includes a passage with one or more ports at a distal end of the catheter and including administering a drug through the passage.

16. The method according to Claim 14, wherein the electrodes each extend no greater than 60 degrees about the exterior of the sheath and the electrodes are positioned along a nerve root where it enters the spinal cord.

17. The method according to Claim 14, wherein the electrodes each extend no greater than 90 degrees about the exterior of the sheath and the electrodes are positioned along a midline of the spinal cord.

18. The method according to Claim 14, wherein the catheter includes an optical channel with one or more ports at a distal end of the catheter and including providing stimulating pulse of photonic energy to the optical channel in combination with or in lieu of the pulses to the electrodes.

19. A catheter to lie along and stimulate tissue comprising:
a sheath having a distal and proximal end;
at least one electrode along the exterior of the distal end of the sheath to lie along tissue; and
a passage extending from an inlet at the proximal end of the sheath to one or more outlets at the distal end of the sheath.
20. A lead according to Claim 19, wherein the outlets are at one or more of the tip of the distal end, the adjacent to the tip of the distal end and on the electrode.
21. A lead according to Claim 19, including an optical fiber in the passage.
22. A lead according to Claim 19, including one or more optical channels extending from a port at the proximal end of the sheath to a port at the distal end of the sheath.
23. A lead according to Claim 22, wherein the port at the distal end is at one or more of the tip of the distal end, adjacent to the tip of the distal end and on one or more of the electrode contacts.